

OPERATION MANUAL

# MODEL MS1200

## SCANNING SIGNAL LEVEL METER

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# MODEL MS1200

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# 1

## Introducing microSTEALTH

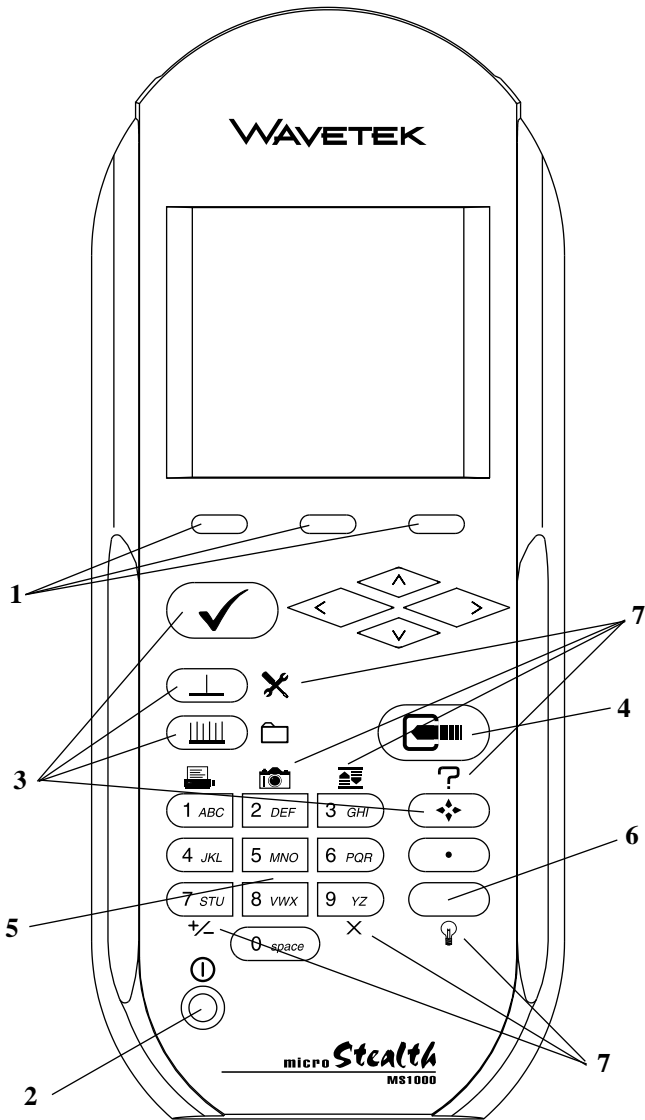
### **INTRODUCTION**

The MS1200 Signal Level Meter is a high performance instrument designed for cable television technicians. The durable, waterproof MS1200 makes innovative use of a graphics LCD to simplify operation. The LCD backlight makes measurements easier in crawl spaces and behind TVs. The display is easy to see in bright sunlight.

A scan mode allows you to see the levels of all carriers in a spectral display. You can also view level measurements at a single frequency or for a specific channel. When tuned to a channel, the display indicates the levels of the video and audio carriers, and the difference between the carrier levels.

When performing an installation, you can press the Installation Check key to quickly verify that all channels are within limits that you have defined. You can use this feature to determine whether or not a subscriber connection meets FCC or other government requirements.

A special channel plan building mode automatically determines which channels are active on your cable system. Once the channel plan is defined, you can copy it to multiple MS1200s using the built-in serial port. Channel plans can also be created using StealthWare, the Windows™ based data management package for Stealth products, and downloaded to multiple MS1200s.



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For documentation purposes, you can print any measurement screen to a serial printer (Wavetek P-Stealth Printer). Following an installation check, you can print an installation report that can be filed with the work order. You can also print a report that lists all configuration settings including the channel plan.

The MS1200 tunes from 45 to 550 MHz with an option to extend the range to 5 to 890 MHz.

## **GETTING ACQUAINTED WITH THE KEYPAD**

The keypad consists of the following:

- three Soft keys
- a Power key
- four Mode Selection keys
- an Enter key
- eleven Alphanumeric keys
- a Shift key

### **1. SOFT KEYS**

There are three horizontally oriented soft keys located below the display. The function of each soft key changes depending on the particular operation being performed and is represented by an icon immediately above the key.

### **2. POWER KEY - ON/OFF**

Turns your microStealth on and off.

### **3. MODE SELECTION KEYS**



#### **INSTALLATION MODE**

Easily check the channels that you have installed and verify that they are within limits.



#### **LEVEL MODE**

Measure the signal level at a specific channel or frequency.



#### **FULL SCAN MODE**

View a spectrum graph of all carrier levels in your channel plan.




#### **NAVIGATOR**

Instantly "travel" to any mode using the NAVIGATOR.

#### **4. ENTER KEY**

Press this key to terminate your entry or selection.

#### **5. ALPHANUMERIC KEYS**

You use the alphanumeric keys to enter data while operating your microStealth. Notice that these keys have a numeral and up to three alphabetic characters labeled on them. You can only access the characters when alphanumeric entry is allowed. In the alphanumeric entry mode, you sequence through each character and the numeral by repeatedly pressing the key. You can also access a set of special characters that do not appear on the keypad by using the up and down arrows. Once the desired character is displayed, move the cursor to the next position using the right arrow. Be sure to terminate your entry by pressing the  key.

#### **6. SHIFT KEY**

Some keys perform more than one function. The secondary function of a key is represented by an icon printed next to it. Notice that the icons are color coded with the SHIFT key. You access the secondary function by first pressing the SHIFT key and then the associated key.

#### **7. SECONDARY FUNCTIONS**



#### **CONFIGURE MODE**

Configure your microStealth for your own specific needs.



#### **AUTO REFERENCE**

Let microStealth automatically set the reference level for you.



### **SNAP SHOT**

Hold the measurement. The measurement is retained even if the cable is disconnected from the input.



### **CLEAR**

Clear-out your entry and start over again.



### **BACKLIGHT ON/OFF**

Quickly turn the backlight on when it is too dark to see the display.



### **POSITIVE/NEGATIVE**

Enter positive and negative values (when allowed).



### **HELP**

View a description of each icon found in the current soft key menu.



### **PRINT**

Print a measurement screen, installation report, or configuration report to a serial printer.

#### **Note:**

The following secondary function is not available on the MS1200:



**FILE**

## **GETTING ACQUAINTED WITH THE SCREEN**

There are certain elements of the screen that will become familiar to you as you use your microStealth.




### **The Title Bar**

Notice the title bar at the very top of the screen. It presents the title and icon for the current mode you are using.



## Title Bar Indicators

You may see indicators appear above the title bar from time to time. This is what they represent:

-  This indicator appears in the top right-hand corner of the screen when you press the SHIFT key. This means that microStealth interprets the next key that you press to be a secondary function.
-  This indicator is displayed to warn you that the battery is low. When you see this, recharge the battery or change to a fresh one as soon as possible.
-  This indicates that the RF synthesizer has become unlocked. If this condition persists, the unit may need repair.

## The Status Bar

Look for the status bar in the lower portion of the screen. It displays a bar meter that indicates the charge remaining in your microStealth's battery. When the battery meter reads low, you will need to switch to a freshly charged battery soon.



## Soft Key Icons

There are three soft keys located immediately below the display. The function of a soft key is represented by the icon directly above it.


### Note

If the soft key function is not currently available, the icon appears "grayed" or "dimmed".

## Lists

Lists present several items for viewing and/or selecting. Notice that the currently chosen item is highlighted. You can scroll through the list using the up and down arrows.





A list can be either "active" or "inactive". You can tell by looking at the border. If the border is solid, the list is active and any keys that you press are directed toward it. If the border is dim, the list is inactive and is not affected by key presses. Usually you can make a list become in focus by pressing the  key.

When there are more items in the list than can be displayed at one time, a scroll bar appears along the right-hand edge of the list. You can use this to get an idea of where you are. When you have reached the first or last item, an arrow appears inside the scroll box pointing to the direction you can go.

### **The Edit Box**

The edit box appears in the lower portion of the screen when it is necessary to enter values into your microStealth.




An edit box can be either "active" or "inactive". You can tell by looking at the border. If the border is solid, the edit box is active and any keys that you press are directed toward it. If the border is dim, the edit box is inactive and is not affected by key presses. Usually you can make a list become in focus by pressing the  key. Be sure to press the  key again when you have finished making your entry.

## ❖ THE NAVIGATOR

You can easily travel to any mode using the NAVIGATOR. To access the NAVIGATOR, press the ❖ key.





An icon appears on the screen for each available mode. Use the up, down, left, and right arrows to highlight the icon that represents the mode you want to use. Notice that the name of the mode appears on the lower portion of the screen beneath the status bar. To get a description of the highlighted mode, press the SHIFT + ? key. To travel to the mode you have highlighted, press any one of the soft keys or the  key.

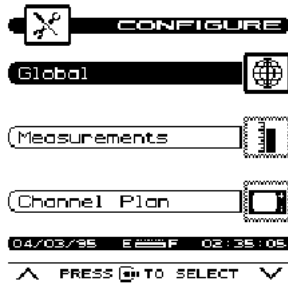
### Tip


You can also use the numeric keys, 1 through 9 to highlight the desired icon in the NAVIGATOR screen. Each key corresponds to an icon in the 3 by 3 matrix.

## CONFIGURING microSTEALTH

Before using your microStealth, you may want to configure it for your specific needs. The CONFIGURE mode allows you to select global and measurement related preferences and to build and edit a channel plan that matches your cable plant.

To configure your microStealth, press the SHIFT +  keys or choose the  icon from the NAVIGATOR. The following screen appears:




Configuration settings are divided into three categories; GLOBAL, MEASUREMENTS, and CHANNEL PLAN. Use the up and down arrows to highlight the category you want and then press the  key.

### Tip

You can also use the left-hand and right-hand soft keys to scroll through the CONFIGURE categories and then press the middle soft key to select the highlighted category.

## PRINTING A CONFIGURATION REPORT

In most configuration screens, you can print a comprehensive configuration report by pressing the SHIFT +  keys. A bar graph appears indicating the status of the printout. The report lists all of the configurable settings including the active channel plan.



### Global Configuration

#### OPERATOR NAME

You can personalize your microStealth by entering your name here. Your name will then appear on report printouts.


## CONTRAST LEVEL

Adjusts the contrast level of the LCD for optimum viewing.

## SHUTOFF TIME-OUT


Sets the amount of inactive time allowed before your microStealth turns off automatically. This feature is useful for conserving battery life by preventing the microStealth from being left on accidentally when it is not in use. You can set the time-out period to 1, 3, or 5 minutes. There is also an "always on" setting that defeats the automatic shutoff feature if desired.

### Note



You can manually turn off your microStealth at any time by pressing the  button.

## BACKLIGHT TIME-OUT

Sets the amount of inactive time allowed before the backlight turns off automatically. The backlight consumes significant power. This feature conserves battery life by minimizing the amount of time that the backlight is on. You can set the time-out period to 5 or 10 seconds. There is an always off setting for when the backlight is not needed at all. There is also an always on setting that defeats the backlight time-out feature.

You can manually turn the backlight on or off at any time by pressing the SHIFT +  keys. When manually activated, the backlight remains on continuously until the unit shuts off.

### Tip

You can tell when the backlight is on even in bright sunlight by looking for the backlight indicator at the left-hand edge of the Title Bar. The  indicator means that the backlight is currently on and will turn off automatically. The  indicator means that the backlight is on and will remain on continuously. If you see no indicator, the backlight is off.

## PRINTER

Select the manufacturer of the printer that you will be using. A printer with a serial interface is required. Set your printer configuration as follows:

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Baud Rate:	same as your microStealth
Date Bits:	8
Stop Bits:	1
Parity:	NONE
Flow Control:	Xon/Xoff

### **Important**

The baud rate of both your microStealth and your printer must match (see BAUD RATE).

### **Tip**

A serial to parallel converter (such as the one manufactured by Black Box Corp.) can be used for printing to a parallel printer.


### **LINES/PAGE**

For text reports, you can specify the number of lines that will be printed on each page before a form feed command is sent. Enter 0 if you do not want any form feeds to be sent.

### **BAUD RATE**

This is the baud rate that is used when your microStealth communicates with another device through the serial port. Generally, you will want to use the highest rate supported. Be sure that the baud rate setting of your microStealth matches that of the device that it is connected to.


### **CLONE**

You can easily transfer the entire configuration from one microStealth unit to another. This saves you time when configuring multiple units. First, connect a cable between the two microStealth units. Select CLONE **only on the unit that you want to copy the configuration to**. Press the  softkey to begin the transfer.


### **Important**

Be sure that the baud rate setting of your microStealth matches that of the device that it is connected to (see BAUD RATE).

### **DIAGNOSTICS**

Performs hardware diagnostics and defaults stored preferences to factory presets. Press the  key to access the diagnostics options.


### **Factory Default**

Sets all stored preferences to factory presets. Press the  key to initiate the default operation.

### **Important**

All stored settings are lost when you perform this operation.

### **Test Display**

Exercises all pixels on the LCD for test purposes. Repeated pressing of the  key sequences the display between all pixels "on", all pixels "off", and the display test screen.



## **Measurements Configuration**

### **SIGNAL LEVEL UNITS**

Selects the units that will be used for all signal level measurements. You can select between; dBmV, dB $\mu$ V and dBm.

### **PROBE COMPENSATION**

This can be used to compensate for losses associated with probe points found on certain amplifiers. You can enter a value between -99.9 and +99.9 dB. Probe compensation is added directly to signal level measurements. The compensation value is indicated in the upper left-hand corner of the measurement screens. There is no indication, however, if the compensation value is zero.

### **Important**

The PROBE COMPENSATION value **does not affect INSTALLATION or CHANNEL PLAN BUILD mode**. Level measurements made while checking an installation are uncompensated.

### **FREQUENCY TUNING STEP SIZE**

This setting affects the increment/decrement step size when you are tuning the frequency using the left and right arrows. You can select a value between 25kHz and 100MHz in steps of 25kHz.


## SCAN AUDIO CARRIERS

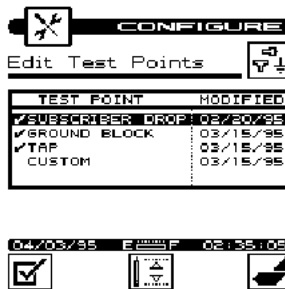
Select YES if you want to see the audio carriers in the full scan screen. You can achieve a faster scan by omitting the audio carriers.



## SCAN SCRAMBLED CHANNELS

Scrambled channels require more time to measure. You can achieve a faster scan by omitting scrambled channels. Select YES if you want to see scrambled channels in the full scan screen.



## EDIT TEST POINTS


Your microStealth is capable of performing tests at various locations including; SUBSCRIBER DROP, GROUND BLOCK, TAP, and USER DEFINED (or CUSTOM). Each test point has its own set of limits that you can edit. Press the  key to edit the test points. A list of available test points appears.





You can enable or disable each test point in the list. When a test point is disabled, you cannot use it when performing tests. Use the up or down arrow to highlight the desired test point. If the highlighted test point is disabled, you can enable it by pressing the  soft key. A check mark appears in the left-hand column to indicate when a test point is enabled. If the test point is already enabled, pressing the  soft key disables it.

### Tip

You can change the name of the USER DEFINED (CUSTOM) test point. Notice that the edit box appears when this test point is highlighted. When you press the  key, the edit box becomes active and you can enter any name up to fifteen characters long. Be sure to press the  key when finished to terminate your entry.

You can edit the limits for the highlighted test point by pressing the  soft key. The limits appear on the screen.






You can selectively enable or disable each individual limit. When a limit is disabled, your microStealth excludes it when checking limits. If the highlighted limit is disabled, you can enable it by pressing the  soft key. A check mark appears in the left-hand column to indicate when a limit is enabled. If the limit is already enabled, pressing the  soft key disables it.

### Note

If you disable all of the limits within a test point, the test point becomes disabled. You cannot enable a test point that has no enabled limits.

---

You can edit the value of the highlighted limit by pressing the  key. When the edit box becomes active, enter the desired value. Be sure to press the  key when finished to terminate your entry.

Press the  soft key to return all limits in the test point to their factory preset values.



## **Channel Plan Configuration**

### **VIDEO SIGNAL TYPE**

Your microStealth is capable of measuring signal levels on NTSC or PAL video signals. You should make sure that the correct video type is selected.


### **CHANNEL SEQUENCE**

You can specify whether channels are listed in numeric or frequency order. This setting also affects the sequence in which channels are tuned in the LEVEL screen when using the left and right arrows.

#### **Note**

The SCAN screen always displays channels in order of frequency regardless of the CHANNEL SEQUENCE setting.


### **BUILD CHANNEL PLAN**


Your microStealth is capable of identifying which channels are on your cable plant. This allows you to quickly and easily generate a customized channel plan. Press the  key and let microStealth learn your system.

#### **Important**


Ensure that your microStealth is connected to the cable system before initiating this procedure.

### Step 1


You are asked to enter a name for the channel plan. Using the edit box, you can enter any name up to fifteen characters long. Be sure to terminate your entry with the  key.


Press the  soft key to continue with the next step.



### Step 2

There are several standard channel plans to use as a foundation for building your plan. Use the up or down arrows to highlight the one that is appropriate for your system. Press the  soft key to continue with the next step.


### Step 3

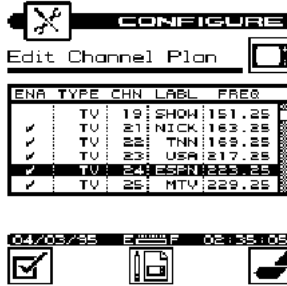
You can tell microStealth what frequency to stop searching for channels. This will save time when building the plan. The frequency you enter should be just above the highest channel on your system. If you are not sure what the frequency of your highest channel is, just use the default value that appears in the edit box. If you have entered a value, be sure to terminate your entry with the  key.

Press the  soft key to begin building the plan.

Upon pressing the  soft key, microStealth begins searching your system for active channels. A bar graph indicates the percentage of the channels searched. After the plan has been built, press the  soft key to return to the Channel Plan Configuration screen.

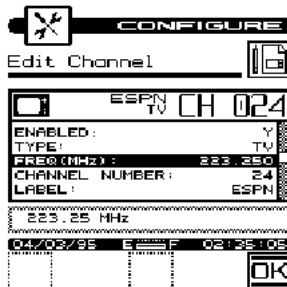
## EDIT CHANNEL PLAN



You can edit various parameters for each channel. Press the  key to edit the channels. A list of all the channels in the plan appears.



You must enable a channel in order to perform measurements on it. A check mark appears in the left-hand column when the channel is enabled. When you built the plan, microStealth automatically enabled all the channels it found to be active on your system. You may want to verify that all your channels have been correctly enabled. Use the  soft key to enable/disable the channel highlighted in the list.

There are several parameters that you can specify for each channel. To do this, highlight the desired channel using the up or down arrow and press the soft key or the key. The parameters for that channel appear.



Use the up or down arrow to highlight the desired parameter. Press the  key to edit the selected parameter. After completing your entry, be sure to press the  key again.

### **Enabled**

As mentioned earlier, a channel must be enabled in order for it to be measured. This is another place where you can enable or disable the channel.

### **Type**

There are three channel types from which to choose:

- TV -the standard video and audio carriers
- DUAL -a video carrier with two independent audio carriers (a European format)
- SNGL -a single carrier

### **Frequency**

This is the frequency of the video carrier in MHz.

### **Channel Number**

The channel number can range from 1 to 999.

### **Label**

You can enter a label up to four characters in length for each channel. This label appears next to the channel number on most screens to help you to remember what programming is on that channel.

### **Package**

You can organize channels into packages. In the edit box, you can select any package that is enabled (see the section on CHANNEL PACKAGES). When you are checking an installation, you can specify which packages the subscriber has ordered and your microStealth will verify that the channels are correctly installed.

### **Scrambled**

If the channel is scrambled, select YES here so that accurate measurements can be made.

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**Important**

microStealth supports several scrambling formats including the following:


Horizontal Sync Suppression

**Audio Offset (TV and DUAL type only)**

This is the offset between the video and audio carriers in MHz.

**Audio Offset 2 (DUAL type only)**


This is the offset between the video and second audio carriers in MHz.

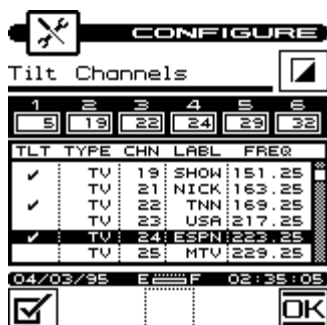
When you are finished editing the channel, press the  soft key to return to the channel list.

**Tip**

Notice that the selected channel number is displayed in the upper right-hand corner of the parameter list. When the list is active, you can use the left or right arrows to select the previous or next channel in the plan. You can also use the numeric keys to directly enter a specific channel number.

**SELECT TILT CHANNELS**

Press the  key to specify which carriers to measure on the TILT screen. A list of all enabled channels in the current plan appears.



Up to six channels can be selected. To select a channel, use the up or down arrow to highlight the desired channel in the list, then press the  softkey. A check mark appears in the left-hand column of the list indicating that this is now a TILT channel. Also, the channel number appears in one of the six boxes above the list. Press the  a second time to deselect the TILT channel.

### Note

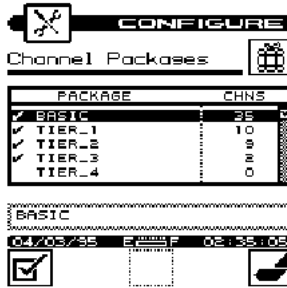
The TILT channel numbers are displayed above the list in order of increasing frequency — not in the order in which they were selected.

When you have finished, press the  softkey.

### CHANNEL PACKAGES

Channel packages allow you to organize channels into groups or tiers. You can specify which channels you have installed for a subscriber when checking an installation. Your microStealth can then determine if the channels are installed properly.

Press the  key to display a list of channel packages.



These are the packages that will be available to you when you edit a channel. You will be able to select from one of these packages for each channel in the plan.

To enable a package, press the  softkey. A check mark appears in the left-hand column to indicate that the package is enabled. If the package is already enabled, pressing the  softkey disables it. You will be asked to verify your intention to disable the package.

### Important


The number in the right-hand column of the package list indicates how many channels are currently using the package. When you disable a package, all channels using that package default to NONE (no package).

To edit the name of a package, use the up or down arrow to highlight the desired package and then press the  key. You can then use the edit box to change the name. Be sure to press the  key when you are finished to terminate the entry.

### Tip

There is no minimum on the number of channels that a package can contain. If you want, you can create a package for only one channel.

## **COPY REMOTE PLAN**

You can easily copy a channel plan from one microStealth unit to another. This saves you time when configuring multiple units. First, connect a cable between the two microStealth units. Select **COPY REMOTE PLAN** **only on the unit that you want to copy the channel plan to**. A list of all available channel plans found on the remote unit appears. Use the up or down arrow to highlight the plan that you want to copy. Press the  softkey to begin copying the plan.

### **Important**

Be sure that the baud rate setting of your microStealth matches that of the device that it is connected to (see **BAUD RATE**).

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# MODEL MS1200

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## 2 Using microSTEALTH



### **INTRODUCTION**

The best way to learn about microStealth is to use it. Section 2 discusses the individual measurements available with the MS1200. Each measurement mode discussion includes detailed descriptions on how to perform the measurement as well as operating controls and indicators.





### **INSTALLATION**

The INSTALLATION mode allows you to easily check the channels that you have just installed and verify that they are within limits. If you have configured channel packages, you can tell your microStealth which packages the subscriber has ordered and it will display only those channels.



Press the  key to select the INSTALLATION mode or choose the  icon from the NAVIGATOR. Your microStealth will begin measuring all the enabled channels in the plan. A bar graph indicates the percentage of channels measured. When microStealth has finished, you can view the results and verify that all channels are within limits.

## SELECTING CHANNEL PACKAGES


If you have configured channel packages, a list of available packages will appear. From this list, you can select the packages that the subscriber has ordered. The number to the right of the package name tells you how many channels are included in each package. Use the up or down arrows to highlight a package and then press the  soft key to select it. A check mark appears in the left-hand column of the list indicating that the package is selected. If the highlighted package is already selected, pressing the  soft key deselects it.

### Tip


Select “ALL CHANNELS” if you want to include **all** the enabled channels in the plan.

Press the  soft key or  when you have finished. Now your microStealth will only evaluate the channels from the packages that you have selected.

### Tip


You can return to this screen at any time to change your package selection by pressing the  soft key.

## SELECTING THE TEST POINT

The next thing you should do is tell microStealth at which test point you are located. This determines which set of limits are used. Press the  soft key to sequence through the available test points. The test point that you have selected is represented in the upper portion of the screen by one of the following icons:

-  Subscriber Drop
-  Ground Block
-  Tap
-  User Defined

### Note

Be sure that you have enabled all of the test points that you are interested in using. The  soft key is only available if there is more than one enabled test point. (see EDIT TEST POINTS).

### Important

Only the limits that are enabled in the selected test point are checked (see EDIT TEST POINTS).

## INSTALLATION RESULTS SUMMARY

This is the overall limit check summary for all channels in the packages that you have selected.





To quickly determine the status of the overall limit check, look at the PASS/FAIL indicator located in the upper portion of the screen. This indicates FAIL if any channel is not within the required limits. For each limit, the worst case actual value is displayed along with a pass/fail status.



### Note

Only the limits that are enabled in the selected test point appear on this screen. If there are no enabled test points, this screen will not be available. You can however, view the CHANNEL LIST and CHANNEL MEASUREMENT screens described below.

## THE CHANNEL LIST

Press the  soft key or  to sequence to the channel list screen.

### Tip

In addition to using the  and  keys, you can also use the left and right arrows to sequence through the results screens.

The channel list provides essential information about each channel.



CHN	LABEL	dBmV	PKG	P/F
19	SHOW	-17.7	TIER_2	X
21	NICK	+0.1	BASIC	✓
22	TNN	+4.5	BASIC	X
23	USA	+1.4	BASIC	✓
24	ESPN	+0.8	BASIC	✓
25	MTV	+2.6	BASIC	✓

In the list you will find the channel number in the first column followed by the label. The level of the video carrier is in the next column. The package in which the channel is contained is displayed in the fourth column. Finally, the overall limits pass/fail result for the channel is found in the last column.

## THE PASS/FAIL INDICATOR

Use the PASS/FAIL indicator located directly above the channel list to quickly determine whether the highlighted channel has passed the limits check. If the channel failed, you can identify the reason(s) for the failure by looking at the symbols that appear in this indicator.



### Adjacent Channel Failures

- lower adjacent channel level
- upper adjacent channel level
- both upper and lower adjacent channel levels

### Video Level Failures

- video level too high
- video level too low

### DVA Failures

- DVA too high
- DVA too low


## CHANNEL MEASUREMENT

Press the soft key or to sequence to the channel measurement screen.




This screen displays video and audio carrier level measurements along with the DVA for the selected channel. Use the up or down arrows to select the previous or next channel in the list.



## PRINTING AN INSTALLATION REPORT

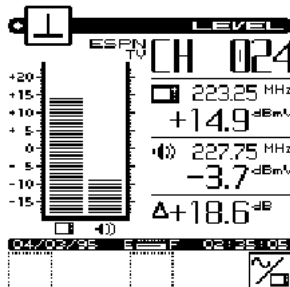
Press the SHIFT +  keys to print a comprehensive report of the installation results. A bar graph appears indicating the status of the printout. The report lists level measurements for all the channels that you installed and indicates out-of-limit conditions with an overall PASS/FAIL conclusion. Space is provided for you to fill in subscriber information. You can attach the report to your work order or file it for future reference.

### Tip

If you have selected another mode and wish to return to viewing the installation results you can do so without having to repeat the measurement process. Simply press the SHIFT +  keys and the results of the most recent installation check will appear. The previous results are no longer available however, once the microStealth is shut off.


## LEVEL

Press the  key to select LEVEL mode or choose the  icon from the NAVIGATOR. Here you can measure the signal level of a specific channel or frequency. The level is indicated both numerically and on an analog meter.




---


## ADJUSTING THE REFERENCE LEVEL

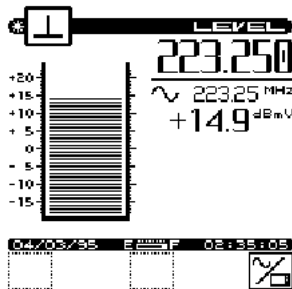
You can adjust the reference level setting of the analog bar meter using the up and down arrows. When you press the SHIFT +  keys, your microStealth automatically sets the optimum reference level for you.

## TUNING BY CHANNEL

When you are tuned to a channel, both the video and audio carriers of the channel are measured and displayed simultaneously. The difference between the video and audio carriers is also shown. The channel number, type and label for the channel that you are currently tuned to appear in the upper right-hand portion of the screen. You can use the left or right arrows to tune to the previous or next enabled channel in the plan. You can also use the numeric entry keys to tune directly to the desired channel. Press the  soft key to tune by frequency.



## TUNING BY FREQUENCY

The  soft key toggles between frequency and channel tuning. When you choose frequency tuning, microStealth tunes to the video carrier frequency of the previously selected channel.




Use the left and right arrows to tune your microStealth. The frequency increments or decrements by the step size that you have specified in the Measurement configuration (see FREQUENCY TUNING STEP SIZE). You can also use the numeric entry keys to tune directly to the frequency desired.

## MEASUREMENT HOLD

You can freeze the level measurement at any time by pressing the SHIFT +  keys. The measurement is retained even if the cable is disconnected from the input port. Notice that the mode icon in the upper left-hand portion of the screen appears inverted while the measurement is on hold. Pressing the SHIFT +  keys a second time releases the hold. The hold is also released when you tune to a different channel or frequency. The measurement is not retained when another mode is selected or the microStealth is shut off.

## PRINTING THE SCREEN

You can print the entire screen at any time by pressing the SHIFT +  keys. A bar graph appears indicating the status of the printout.

### Tip

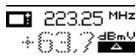
If you are using your microStealth at a location where it is not convenient to connect to a printer (such as on a pole), you can put the measurement on hold until you are able to access the printer.

## WARNING INDICATORS

If the current measurement is inaccurate due to an out-of-range condition or hardware failure, microStealth warns you by dimming the numeric measurement value and displaying one of the following warning indicators.

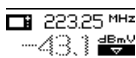
### Over-range

The signal level is above the measurement range of the instrument.



### Under-range

The signal level is below the measurement range of the instrument.





## Error

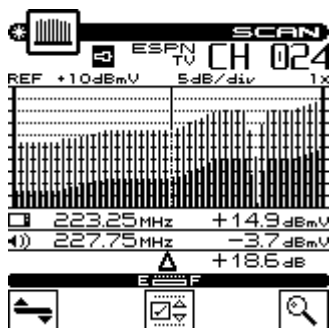
A hardware problem exists. If this condition persists, the unit may need repair.

223.25 MHz  
+14.9 dBmV



## FULL SCAN


Press the  key to select the FULL SCAN mode or choose the  icon from the NAVIGATOR. A spectral graph of all the carriers in the channel plan appears.







## MOVING THE MARKER

A vertical marker appears over the currently selected channel. The channel number, type and label appear in the upper right-hand portion of the screen. The frequency and level of the video and audio carriers for the selected channel can be seen directly beneath the graph. You can use the left or right arrows to select the previous or next channel. You can also use the numeric entry keys to tune directly to the desired channel.





### **ADJUSTING THE REFERENCE LEVEL**

The reference level setting is displayed above the graph. This is the level at the very top line. You can adjust the reference level using the up and down arrows. When you press the SHIFT +  keys, your microStealth automatically sets the optimum reference level for you.

### **ADJUSTING THE SCALE**


The scale setting is displayed above the graph. You can adjust the scale to provide the best view of the carrier levels by pressing the  soft key. A new set of soft keys appear. Use the  and  soft keys to increment and decrement the scale value. Press the  soft key when you have finished.

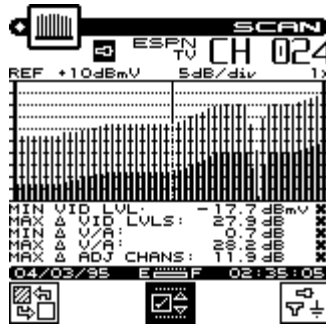
### **ZOOMING IN AND OUT**


To zoom in on or out from the channel selected by the marker, press the  soft key. A new set of soft keys appear. Use the  soft key to zoom in and the  soft key zoom out. The magnification factor is displayed above the graph. Press the  soft key when you have finished.





### **CHECKING LIMITS**

You can verify that the carrier levels are within limits. First, you need to tell microStealth which test point you are at. This determines which set of limits are used.


Press the  soft key to access the limits submenu. A new set of soft keys appear.



Press the  soft key to sequence through the available test points. The test point that you have selected is represented in the upper portion of the screen by one of the following icons:

-  Subscriber Drop
-  Ground Block
-  Tap
-  User Defined

### Note

Be sure that you have enabled all of the test points that you are interested in using. The  soft key is only available if there is more than one enabled test point. (see EDIT TEST POINTS).

When you have selected the limits submenu, the marker information below the graph is replaced by the overall limit check summary for channels **currently being displayed on the graph**. For each limit, the worst case actual value is displayed along with a pass/fail status. The results are updated upon the completion of each scan.

```

MIN VID LVL: -17.7 dBmV XX
MAX Δ VID LVLS: 27.9 dBm XX
MIN Δ V/A: 20.7 dBm XX
MAX Δ V/A: 11.9 dBm XX
MAX Δ ADJ CHANS: 11.9 dBm XX


```

### Important



The limit check results apply only to the channels currently being displayed on the graph — not the entire channel plan.


### Note

Only the limits that are enabled in the selected test point appear on this screen.

Your microStealth can indicate the minimum and maximum carrier level limits on the graph. The out-of-limit portions appears as diagonal “hash” areas. You can toggle the hash lines on and off by pressing the  key.

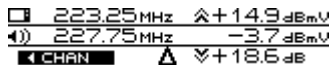
### Note

The limit check results are updated with each scan. They are also update immediately when you press the  or  soft keys.



When you are finished viewing the overall limit results, press the  soft key to return to the main menu.

## CHECKING LIMITS ON AN INDIVIDUAL CHANNEL




Indicators appear in the marker information area when a channel is outside the limits of the currently selected test point.





Up or down arrows to the left of the video level and DVA numeric measurement tell you when the limits have been exceeded.

 measurement too high  
 measurement too low


When an adjacent channel error occurs, one of the following indicators will appear in the lower left-hand area of the marker information area:

 lower adjacent channel level  
 upper adjacent channel level  
 both upper and lower adjacent channel levels


## MEASUREMENT HOLD

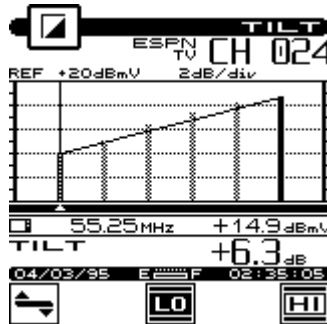
You can freeze the scan measurement at any time by pressing the SHIFT +  keys. The measurement is retained even if the cable is disconnected from the input port. Notice that the mode icon in the upper left-hand portion of the screen appears inverted while the measurement is on hold. Pressing the SHIFT +  keys a second time releases the hold. The measurement is not retained when another mode is selected or the microStealth is shut off.

## PRINTING THE SCREEN

You can print the entire screen at any time by pressing the SHIFT +  keys. A bar graph appears indicating the status of the printout.

## TILT

TILT mode simplifies the process of balancing an amplifier. TILT mode can only be accessed by choosing the  icon from the NAVIGATOR. A spectral graph of the TILT carriers appears.





### Important

You can choose which carriers appear on this screen when you configure your channel plan (see SELECT TILT CHANNELS).


## MOVING THE MARKER

You can view up to six carriers. A vertical marker appears over the currently selected carrier. The channel number, type and label appear in the upper right-hand portion of the screen. The frequency and level of the selected carrier can be seen directly beneath the graph. You can use the left or right arrows to select the previous or next carrier.





## SELECTING THE LOW AND HIGH CARRIERS

Notice that the bars representing the low and high pilots are solid and all others are dim. You can select which carriers are used for the tilt measurement. To select the low pilot carrier, move the cursor to the desired carrier and press the  soft key. To select the high pilot carrier, move the cursor to the desired carrier and press the  soft key. The tilt measurement is calculated from the low and high pilot carriers that you have selected.



## ADJUSTING THE REFERENCE LEVEL

The reference level setting is displayed above the graph. This is the level at the very top line. You can adjust the reference level using the up and down arrows. When you press the SHIFT +  keys, your microStealth automatically sets the optimum reference level for you.


## ADJUSTING THE SCALE

The scale setting is displayed above the graph. You can adjust the scale to provide the best view of the carrier levels by pressing the  soft key. A new set of soft keys appears. Use the  and  soft keys to increment and decrement the scale value. Press the  soft key when you have finished.

## MEASUREMENT HOLD


You can freeze the tilt measurement at any time by pressing the SHIFT +  keys. The measurement is retained even if the cable is disconnected from the input port. Notice that the mode icon in the upper left-hand portion of the screen appears inverted while the measurement is on hold. Pressing the SHIFT +  keys a second time releases the hold. The measurement is not retained when another mode is selected or the microStealth is shut off.

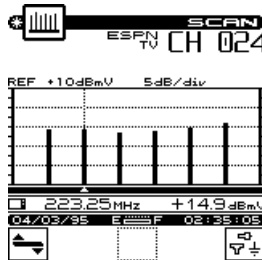
## PRINTING THE SCREEN

You can print the entire screen at any time by pressing the SHIFT +  keys. A bar graph appears indicating the status of the printout.



## SCAN

The MS1200 includes an additional SCAN mode that can display up to six video carriers. You can access this mode by choosing the  icon from the NAVIGATOR.




### Note

The channels that appear on this screen are the same ones that you selected when you configured your tilt channels. (see SELECT TILT CHANNELS).





## MOVING THE MARKER

A vertical marker appears over the currently selected carrier. The channel number, type and label appear in the upper right-hand portion of the screen. The frequency and level of the selected carrier can be seen directly beneath the graph. You can use the left or right arrows to select the previous or next carrier.


## ADJUSTING THE REFERENCE LEVEL





The reference level setting is displayed above the graph. This is the level at the very top line. You can adjust the reference level using the up and down arrows. When you press the SHIFT +  keys, your microStealth automatically sets the optimum reference level for you.

## ADJUSTING THE SCALE


The scale setting is displayed above the graph. You can adjust the scale to provide the best view of the carrier levels by pressing the  soft key. A new set of soft keys appears. Use the  and  soft keys to increment and decrement the scale value. Press the  soft key when you have finished.


## CHECKING LIMITS

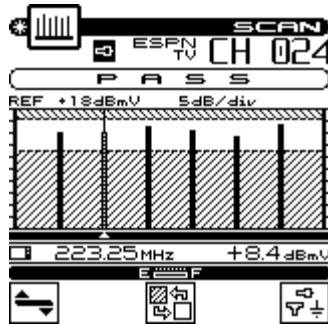
You can verify that the carrier levels are within limits. First, you need to tell microStealth which test point you are at. This determines which set of limits are used. Press the  soft key to sequence through the available test points. The test point that you have selected is represented in the upper portion of the screen by one of the following icons:

	Subscriber Drop
	Ground Block
	Tap
	User Defined

### Note



Be sure that you have enabled all of the test points that you are interested in using. The  soft key is only available if there is more than one enabled test point. (see EDIT TEST POINTS).

When you have selected the proper test point, microStealth shows the minimum and maximum carrier level limits for that test point on the graph. The out-of-limit portions appears as diagonal “hash” areas. You can toggle the hash lines on and off by pressing the  key.




You can quickly check to see if all SCAN carriers are within limits by looking at the PASS/FAIL indicator above the graph.

### MEASUREMENT HOLD

You can freeze the scan measurement at any time by pressing the SHIFT +  keys. The measurement is retained even if the cable is disconnected from the input port. Notice that the mode icon in the upper left-hand portion of the screen appears inverted while the measurement is on hold. Pressing the SHIFT +  keys a second time releases the hold. The measurement is not retained when another mode is selected or the microStealth is shut off.

### PRINTING THE SCREEN

You can print the entire screen at any time by pressing the SHIFT +  keys. A bar graph appears indicating the status of the printout.



# 3


## Reference

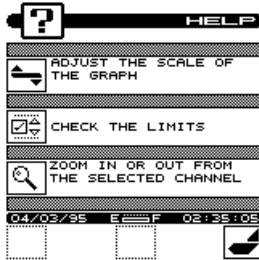
### **USING THE REFERENCE SECTION**

This section provides additional information concerning the use of the MS1200. Items to be discussed include; Help, Information, and Technical Support.




The HELP mode provides on-line user assistance by means of context-sensitive help screens. During normal operations, soft key icons appear at the bottom of the display. Each help screen describes the condition of the soft key icons at the time HELP was pressed.

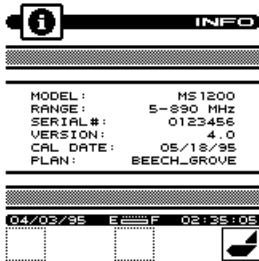
Press the SHIFT +  key to select the HELP mode.



Next to the icon is a brief description of the function that the soft key performs. If an icon is currently inactive "feature not available" is displayed.

## INFORMATION

Choose the  icon from the NAVIGATOR. Here you can view information concerning your MS1200. The type of information includes; model, frequency range, serial #, firmware version, calibration date, and channel plan.



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## **TECHNICAL SUPPORT**

Although we've worked hard to make the MS1200 as easy-to-use as possible, the wide range of cable television applications can make proper operation a difficult task. If you have a problem using your unit you can contact Wavetek's Technical Support for help. You can reach Wavetek's Technical Support, Monday through Friday between 8 am and 5 pm at **(317) 788-5960**. Wavetek also maintains a support forum on the Internet. You can leave messages and a Technical Support Specialist will get back to you at Internet address: [CATVSUPPORT@wavetek.com](mailto:CATVSUPPORT@wavetek.com).

If you received your unit and found it to be damaged or incomplete in any way, phone Wavetek immediately. Save the shipping carton and packing material in the event that you have to return it.

FOR CUSTOMER SERVICE call: WAVETEK (800) 851-1198, International Customers, contact your local Wavetek Representative.



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# MODEL MS1200

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## A Appendix A: Specifications

### **SPECIFICATIONS**

#### **Frequency**

Range: 45 to 550 MHz; 45 to 890 MHz (optional);  
sub band option (5 to 45 MHz)  
Accuracy:  $\pm 10$  kHz @ 25°C; ( $\pm 20$  kHz over temp.)  
Resolution Bandwidth: 300 kHz  
Tuning Resolution: 25 kHz

#### **Level Measurement**

Range: -20 to +45 dBmV  
Resolution: 0.1 dB  
Accuracy:  $\pm 0.75$  dB Flatness;  $\pm 0.75$  dB Linearity

#### **Scan Mode**

Number of Channels: 120  
Scan Rate: Approximately 6 carriers / second

#### **General**

Dimensions: 4.25" (W) x 10" (H) x 2.5" (D)  
Weight: 0.8 kg (1.75 lb.)  
Operating Temp. Range: -10 to +50°C (14 to 122°F)  
Water Resistance: Meets or exceeds MIL-STD-810D  
(Method 506.2)

**Powering**

Battery Life: 3 hours continuous (backlight off), replaceable battery cartridge  
Charge Time: 16 hours with unit off; 30 hours slow charge (with unit operating)

**Standard Accessories**

4010-00-0114: microStealth AC/DC charger/adapter  
1219-00-1223: Battery cartridge for microStealth

**Options**

MSUHF; Frequency extension to cover range: 45 to 890 MHz  
Sub Option: Frequency extension to include 5 to 45 MHz  
microStealth Carrying Case; Durable padded cordura carrying case for microStealth  
1219-00-01223: Field replaceable microStealth battery cartridge

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# MODEL MS1200

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## B Appendix B: Power Management and Battery

### **Battery Pack Location and Installation**

The MS1200 battery pack is located on the back of the unit. To remove or replace the battery pack, pull the notched tab downward, and lift up the battery pack.

To install the battery pack, insert the bottom of the pack into the groove and press down on the battery pack until it clicks into place.

### **Charging the Battery Pack**

To recharge the battery pack, plug the AC adapter into the unit. The unit will reach fully charged in 16 hours with unit off, and 30 hours with unit operating.

### **Battery Tips**

The MS1200 is shipped from the factory only with a light charge. You should recharge the battery upon receipt of your unit to ensure a full charge.

To maximize battery life, set Auto Shutoff to 1 minute and Back-light Shutoff to "always off". These items are described in the Global Configuration section.



# MODEL MS1200

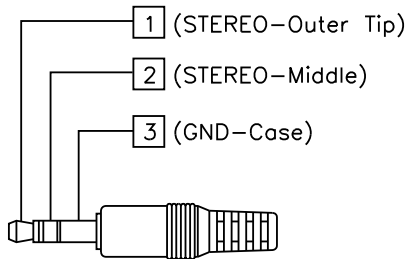
## C Appendix C: Interface Port

### CONNECTOR

The MS1200 has a serial interface with RS232 drive, using a 3-pin stereo connector. The serial interface has a driver built in for RS232 serial binary data interchange. The connector is located on the bottom of the unit behind a waterproof cover.

#### Pin Assignments for Interface Port

Signal	Pin	Description
TXD	1	Transmitted Data
RXD	2	Received Data
GND	3	Ground



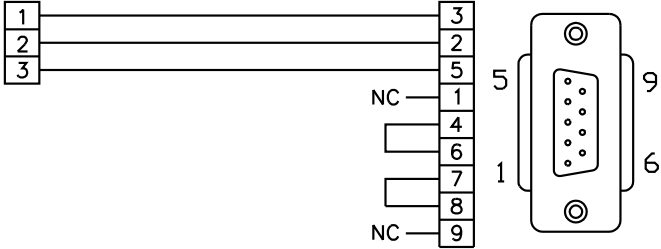
STEREO PLUG DETAIL

# CABLE SPECIFICATIONS

## MICROSTEALTH TO PC

STEREO PLUG, LOCATION A

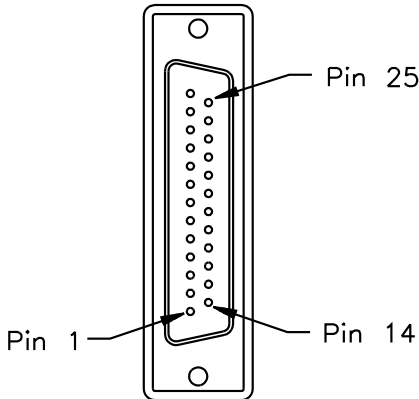
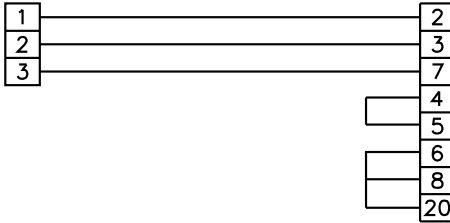
DB9, LOCATION B



## MICROSTEALTH TO PRINTER(STANDARD)

STEREO PLUG, LOCATION A

DB25, LOCATION B

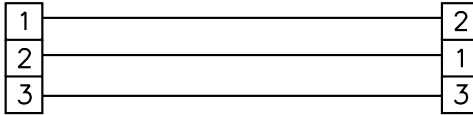


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## MICROSTEALTH TO MICROSTEALTH

STEREO PLUG, LOCATION A

STEREO PLUG, LOCATION B



## MICROSTEALTH TO PRINTER(CITIZEN)

STEREO PLUG, LOCATION A

26 PIN, LOCATION B

